

Water Quantity

Comments Submitted via Discussion Forum

4/14/2008 – 5/9/2008

From: Jeff Dillon

Date: 05/06/2008

Comment: 1. Much was said about water impairments and their affects on the health of Puget Sound at the topic forum. Almost all the discussion was centered on alterations in the volume of water as a threat to Puget Sound, particularly to it's mainstem rivers and principal tributaries. I did not find much discussion on the relationship between the timing of that water into these systems. A few statements on dam operations and normative flows are touched on in the document but neither recognize the threat that the loss of high channel forming flows have on river sustainability. Erosion is a key process that delivers sediment and nutrients into Puget Sound as well as providing flushing flows to lower mainstem river systems. Please include this feature as a threat and theme to the water quantity discussion.

2. The notion of adequate water is intriguing but hard to define. It is possible to have all the natural water returned into a stream and still not have adequate water. Some small tributaries and coastal streams just don't have sufficient water supply to support salmon populations. Also, there is a linkage between the amount of water provided to any particular system and the physical processes that are expected to be maintained by those flows. I found little linkage between the loss of water in a system and negative affects on physical processes. A few high level statements are made at the start of the document and further acknowledged in the conceptual model but not followed up on in the document. My comment would be to find a place to make that linkage in the document even if it's only to explain the conceptual model and find a home for it in the document.

3. Need more explanation of the risks to ecosystem health (Fresh and marine systems) from changes in in the natural hydrograph. This is a theme that takes a back seat to recommendations that address how to maximize river flow into local freshwater systems.

4. I found that the report makes mention of controlling low flows presumably caused by withdrawal of water. High flows may also be constrained by flood control operations, water supply or hydropower facilities. These alternations have strong connections to habitat maintenance and should be recognized as a threat to Puget Sound.

5. There is a connection between human encroachment and land use impacts on

delivery of water for aquatic habitat formation. Encroachment onto floodplains can lead to restrictions on flood related discharges from flood control/ hydropower/water supply facilities. If the risk of injury, damage to floodplain structures and inhabitants becomes too great, than it can precipitate changes in flood control operations, most commonly by reducing maximum regulated outflows. This in turn reduces the amount of high flow allowed to pass during a flood and ability to inundate side channels, move sediment, gravels and large woody debris and the habitat creation processes that follow from that.

From: Kyle Loring

Date: 05/06/2008

Comment: (1) We appreciate the Partnership's recognition of potential impacts related to exempt wells and applaud the Partnership's proposal to quantify and monitor cumulative water usage by exempt wells and to evaluate groundwater available for future use by all water users. This is particularly critical in San Juan County, where there is a growing trend to install a single well and then utilize the maximum exempt amount of 5,000 gallons per day for multiple off-site connections to that well. As such wells draw down groundwater levels, where a geohydrological connection exists between the groundwater and surface water, surface water flows likely will also decrease.

In addition, in the absence of opposition to a local water withdrawal application, wells may be constructed without demonstrating with scientifically-defensible evidence that sufficient capacity exists for proposed connections, much less existing users of the water source. Thus, Friends' urges the Partnership to examine the well permitting practices that occur at the local level to determine whether they are designed to ensure that proposed withdrawals do not adversely impact current users. This issue is particularly pressing along shorelines, where saltwater intrusion may result from overburdening existing wells, and where such intrusion may then adversely impact the marine environment.

(2) While the Partnership's Discussion Draft for the Fresh Water Forum references desalination plants, it does not identify the lack of information that exists regarding impacts from such facilities. Indeed, desalination plants may adversely impact both the environment and public health. Because desalination plants require substantial energy inputs, they can contribute significantly to climate change when powered by fossil fuel energy sources. See Pacific Institute, Desalination, With a Grain of Salt: A California Perspective (June 2006) (accessible at http://www.pacinst.org/reports/desalination/desalination_report.pdf) (last accessed March 17, 2008). Other public health concerns associated with desalination water

include the potential concentration of toxic chemicals or metals. Id. Boron, a constituent that has been linked with reproductive and development toxicity, has been found in elevated levels in water furnished through desalination. Id.

In addition to potential human health impacts, the discharge of the briny process wastewater can cause adverse impacts in the marine environment. Id. The outfall from a desalination plant typically contains concentrated salt that, when discharged, disrupts the natural salinity of the receiving waters. Id. Because the briny discharge is heavier than the receiving waters, it sinks toward the sea floor, where the mixing activity is much slower than near the surface, inhibiting the dilution that might otherwise occur. Id. In addition to a substantial salt concentration, this heavier solution may contain heat and persistent toxic chemicals used during the desalination process. There is also the potential for bioaccumulation or synergistic impacts of these constituents. Lastly, during water withdrawal, marine organisms may be subject to impingement (pinning against intake screens) and entrainment (withdrawal of the organisms in the supply saltwater) that lead to significant mortality. In San Juan County, such plants are being sited in shallow embayments with low or slow flushing action, which may exacerbate the impacts identified above.

In addition, the creation of new water sources along the state's shorelines may increase development pressures in otherwise undevelopable areas (due to lack of potable water), leading to an increase in the built environment and impervious surfaces, further impacting marine shorelines. Consequently, we urge the Partnership to fully examine the cumulative impacts of desalination plant construction and operation along state shorelines.

In addition, the matrix at page 37 suggests that desalination plants are located in coastal areas with sufficient current and environmental conditions. However, at the local level, a permit can be obtained to construct a desalination plant without making a showing that marine current and environmental conditions can support a desalination plant with no or minimal impact.

From: Art Castle

Date: 05/05/2008

Comment: The Home Builders Association of Kitsap County launched our environmentally-friendly building program in February, 1997. It was updated in 1998 to include a land use development checklist as well, and the name was changed to Built Green® in 2002. Our program provided tours to the NAHB Green Building Conferences in 2001 and 2002. The program has received numerous local, state and national awards and has been used as a model for other Built Green® programs around Washington

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In 2003, the HBA created the Kitsap Home Builders Foundation. The foundation is currently nearing completion on an EPA Section 319 Clean Water Act grant (grant contract signed in October, 2005) to develop Low Impact Development Standards and have them adopted by our four cities and county. In addition, the foundation received a Puget Sound Action Team PIE grant to retrofit the Home Builders Association's office site as a Low Impact Development Showcase. That project was completed in 2007. Additional information on both grants is available on our grants website at www.KitsapLID.org.

Land development and stormwater are some of the primary drivers (if not the primary driver) for marine and fresh water degradation. And we know that slowing and reversing that trend will require actions on many fronts including regional/watershed planning, transportation systems, education, and better site scale design and implementation. Low Impact Development is arguably the best set of tools we have for managing stormwater at the site scale is omitted or mis-represented from these three Topic Forum documents that is central to policy and action development.

We believe that Low Impact Development techniques are perhaps the most effective and likely least expensive tools available. With fair flow credits, low impact development will become tools of choice in jurisdictions that has enabled their use, except where the soils, slope, etc are inappropriate for its use.

The PSP "Initial Discussion Draft" documents for Freshwater Resources Topic Forum, Water Quality Topic Forum, and Land Use/Habitat Protection Topic Forum have been reviewed. We are concerned that Low Impact Development and its set of stormwater volume and water quality tools has been largely omitted in these three draft documents. Where it has been mentioned, there is factual inaccuracies and other misleading statements that show that the authors of the documents are clearly not knowledgeable about low impact development and its many techniques.

We will first point out issues with each of the three Topic Forum documents, then provide information on recommendations regarding what should be included in the work plan regarding low impact development.

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On page 18, Key Findings A. In the second paragraph it states "The Land Use and Water Quality Topic Forums are addressing the effectiveness of management approaches aimed at reducing threats associated with land use and stormwater practices ..."

This is inaccurate. The other documents do not adequately or fairly provide accurate information or provide mis-leading information about low impact development.

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This is a spectacular omission! Low Impact Development is arguably the best set of tools we have for managing stormwater at the site scale is omitted from a document that is central to policy and action development.

Land Use/Habitat Protection and Restoration Topic Forum

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On page 66, 3. "The focus should be to minimize land conversion to urban-style uses or intensities outside UGA's and to require best management practices and low impact development standards within resource and rural lands which have the highest value for preservation of habitat and eco-systems that support the health of the Puget Sound."

On page 67, 3 "Within urban growth boundaries, critical existing ecosystem processes, structures and functions should receive special protection. Where it does not exist, actions should concentrate on reducing polluted run-off, low impact development standards, and site specific shoreline clean-up and restoration where it can make a difference."

On page 69, 9. "Require low impact development techniques to be used in all Puget Sound jurisdictions to reduce the loss of forest cover and increase impervious surfaces. Low impact development techniques include limitations on clearing in rural areas where maintenance of existing hydrology is most likely through maintenance of natural systems rather than reliance on engineered solutions."

Page 20, Supply Strategies. In the second paragraph there is discussion of the "limited ways to physically put water back into streams".

These references in the Habitat/Land Use paper are extremely limited, myopic and somewhat of a distortion of low impact development techniques.

Low Impact Development techniques such as bioretention and pervious pavement are effective at both water quality treatment and aquifer recharge, especially important in Kitsap County where 80% of all potable water comes from wells. But there is another important benefit. The low impact development techniques that infiltrate stormwater also reduce stormwater temperature ten to fifteen degrees within the first several hours and allow sub-surface seep of naturally treated stormwater into streams and wetlands. These are important tools neglected in the Topic Paper.

Page 26. Washington State Water Law.

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These references to low impact development only discuss one technique - that of surface dispersion into natural vegetation, sometimes mentioned as the 65/10 (65% native vegetation and 10% impervious surface). Using this technique mitigates stormwater 100%. However, it is only one of many techniques that include such things as bioretention cells, pervious pavement, amended soils, minimum excavation foundations, vegetated roofs and amended soils. The document is thus misleading as to what low impact development is, and it's role in Land Use/Habitat Protection. In addition, its recommendation to "Require low impact development techniques to be used in all Puget Sound jurisdictions to reduce the loss of forest cover and increase in impervious surfaces" is simply more "mandate and regulate" philosophy - and it is not accurate and won't do what it says it will! Even if the statement is approved such practices aren't going to achieve what this says will be achieved. This one (the most controversial and likely least to be used) technique preserves native vegetation and

limits impervious surfaces only.

In addition, three Kitsap County jurisdictions currently have provisions that in some cases allow the use of low impact development techniques in the buffers of wetlands and streams. Where approved, these low impact development techniques provide water quality treatment and subsurface seep, after reducing stormwater temperatures, of clean water into streams and wetlands. This enhances not only water quality but habitat and the hydrology.

Water Quality Topic Forum

Page 17. Low Impact Development methods. "Low Impact Development methods: Low impact development techniques for stormwater management include the installation of features that attempt to mimic natural hydrologic conditions, such as porous pavement, infiltration facilities, rain gardens, and other techniques (Puget Sound Action Team, 2005). Limited research has been conducted on the effectiveness of low impact development techniques to improve water quality."

Amazingly, this is the only reference to low impact development in the Water Quality Topic Forum is this section. And it is not accurate! There are hundreds, if not thousands of research papers that have been written about low impact development techniques and how effective they are in naturally treating pollutants in stormwater.

In fact, the research shows that these techniques are substantially more effective in removing pollutants from stormwater than any of the traditional techniques. The Department of Ecology already considers bioretention as an "enhanced treatment facility" and based on other research, pervious pavements should also be considered as an "enhanced treatment facility." Low Impact Development techniques have been used in some areas of the world for over fifty years. There is growing use of the techniques throughout the United States, Europe and elsewhere in the world. Monitoring and research are all showing effective treatment of such stormwater pollutants as suspended solids, hydrocarbons, organic carbon, dissolved metals, fecal coliform, bacteria, and depending on technique design, nitrogen among others. Certainly more monitoring and research is warranted - but these techniques have proven they work and are effective elsewhere.

Additional Recommendations

Watershed Modeling

Low Impact Development techniques provide the opportunity to significantly reduce "effective impervious surfaces." All watershed modeling that we've seen "assumes" future development will have the same percentage of impervious surfaces as past

development and this projects the loss of habitat, stream erosion, reduction in water quality and other environmental degradation based on those assumptions. However, low impact development techniques depending on the soils, slopes and site conditions can significantly reduce effective impervious surfaces and in some cases even get to a zero or near zero "net effective impervious surface." If the use of low impact development techniques were included in modeling, the resultant negative environmental effects would be substantially less. The watershed monitoring tools should be changed to allow alternative types of development and techniques. They could then project how different types of development and techniques such as low impact development would effect the watershed.

Science of Low Impact Development

We've read hundreds of studies, research papers, reports and articles about low impact development techniques over the past several years, and there is a significant theme in every document. Low Impact Development techniques, especially bioretention cells and pervious pavement, are very effective in providing dramatically enhanced water quality treatment. They naturally treat or dramatically reduce a wide range of stormwater pollutants including hydrocarbons and dissolved metals. The Department of Ecology currently considers bioretention cells as "enhanced water quality treatment facilities" and we believe that pervious pavement where the stormwater goes to soil should also be approved as an "enhanced water quality treatment facility." The research clearly shows the performance and results.

We will not attempt to compile a complete list of reference documents. Instead we recommend two specific actions.

First, gather scientific studies, reports, monitoring results, documentation and other documents listed as references and appendixes in such publications and organizations as the;

- . 2005 Puget Sound Action Team Low Impact Development Technical Guidance Manual for the Puget Sound; Prince Georges County, Maryland LID Analysis document and their LID Strategies document;
- . U.S. Department of Housing and Urban Development - The Practice of Low Impact Development; Metropolitan Milwaukee Sewerage District (MMSD) Surface Water & Stormwater Rules Guidance Manual for Low Impact Development;
- . City of Portland, Oregon Stormwater Management Manual for Low Impact Development;
- . Seattle Public Utilities Natural Drainage Systems Program;
- . Pierce County Water Quality Program;
- . The Low Impact Development Center (www.lowimpactdevelopment.org);
- . WSU Extension Service Water Quality;
- . EPA Municipal Technology Branch;
- . University of Washington Department of Civil and Environmental Engineering;

- . University of Connecticut;
- . Villanova University;
- . NAHB Research Center (www.nahbrc.org)

There are many more references available in addition to those above. There is a wealth of research and monitoring results regarding low impact development throughout the U.S. as well as Europe and other countries.

Second, I would recommend requesting the creation of a Low Impact Development working group to gather and review known science regarding the water quality benefits of low impact development. Among those who should be included in the work group are; Dr. Chris May, Seattle Public Utilities and Curtis Hinman, WSU Extension - Pierce County. I would trust their judgment both for others who could contribute to the work group and what is appropriate known science. This work group could also develop recommendations for future research efforts regarding low impact development.

Low Impact Development Recommendations for the Puget Sound Partnership

Include Low Impact Development techniques as an important part of water quality improvement for the Puget Sound.

Flow Credits

Encourage review of existing monitoring projects to evaluate flow credits for low impact development techniques, especially for pervious pavement and bioretention. Currently DOE allows the void area in the volume of a bioretention cell to be used for volume mitigation, unless the bioretention cell has under piping. With under piping only the volume below the pipe is allowed for volume mitigation. The Seattle SEAShore project (has under piping) when modeled by the DOE method only shows a modest volume benefit, yet the project's own actual monitoring shows over 99% reduction in volume leaving the site compared to pre-retrofit, and it is reported that no stormwater has left the site since 2003 despite several unusually large storm events since. Bioretention is likely to be the widely used LID practice and one that shows spectacular results for water quality and infiltration back to aquifers.

DOE allows publicly owned pervious pavement to be modeled as landscaping, which still requires additional volume mitigation. If privately owned, it is treated as half landscaping and half impervious surface, which can be addressed by adequate maintenance requirements so that privately owned pervious surfaces can be treated as landscaping for volume mitigation. When under piping, all volume mitigation is eliminated. Thomas Cahill is an engineer with over 20 years experience in designing and monitoring pervious pavements in the upper Midwest, New England, and Eastern Seaboard (in addition to Portland, Oregon). In articles, he reports that he designs the flow from five impervious acres into each acre of pervious pavement. We

point this out to show the dramatic gap between flow credit modeling currently allowed by DOE and proved practices in other areas of the country.

"Fair" flow credits are needed. As flow credits become fairer, it is our opinion LID implementation will become the stormwater mitigation strategy of choice where LID use is appropriate.

Education

Encourage and support additional technical training on how to design, install, maintain as well as review and approve low impact development practices. Continuing education for the public, private sector, land owners, public and private sector engineers are all important so that all understand exactly what low impact development is and is not. The education should also teach to utilize these techniques in project design and construction - as well as how project that utilize LID techniques are reviewed and approved.

Rainwater Harvesting

Rainwater Harvesting is a potentially significant low impact development technique that is severely limited in usage due to Surface Water Rights issues. DOE currently allows rainwater harvesting without a surface water right permit for de minimus uses (i.e. for one single family home). Surface Water Right permitting is lengthy, expensive and difficult to obtain for larger projects. There should be a simpler, less expensive and more timely Surface Water Right permit when rainwater harvesting is used on larger projects. When an annual water budget that shows how all the collected stormwater will be used during that year, the roof area is no longer considered impervious. Uses for rainwater collection include; irrigation, grey water uses and when approved by the local health district even for potable uses. The environmental benefits include; collecting stormwater during it's peak events which reduce the volume effects traditionally found from impervious surfaces. The water is then returned to the surface or subsurface through irrigation, or internal building uses - generally through a septic system. While the stormwater is used, it is more delayed in it's return to the natural environment - generally returning large percentages of it back to the environment during drier periods of the year.

Maintenance

Maintenance is an important issue with low impact development techniques. Maintenance often raises questions of how to insure that LID installations will continue to perform in the future. While more research is warranted, LID maintenance requirements (especially for bioretention cells and pervious pavement) are simple and relatively inexpensive. In the initial LID implementation stages the concern will be greater than once regulators have a period of time to actually monitor the effectiveness of different maintenance practices. While an important issue, education and practical applications will provide greater understanding and

insight for regulators to understand appropriate maintenance practices.

Voluntary or Required

We believe that Low Impact Development should remain a voluntary stormwater mitigation strategy. Certainly incentivized to encourage its use where appropriate, but should not be required. Low Impact Development practices are not appropriate for all sites. LID practices are important, but only a partial solution to proper stormwater management. Other stormwater techniques such as regional or area management are other parts to the stormwater puzzle. In areas where soils are unsatisfactory for infiltration, there should be surface or piped conveyance to "regional" or "area" management. This could be on a fee basis to support these activities, and at these regional or area management facilities low impact development, detention, and other techniques could be used to clean the stormwater before infiltration or its use to supplement the hydrology of wetlands and streams.

We know that low impact development is very effective in removing stormwater pollutants. With fair flow credits it will also reduce development costs for stormwater mitigation, provide additional amenities to the development projects and reduce private and public maintenance costs.

Encouragement of its use by consistent standards for design and approval. Assistance in eliminating its use as an "exception" (exceptions take lots of time and money for approval.. "no good deed goes unpunished") in local codes. As these occur, low impact development will become the desired stormwater mitigation strategy for most future development - providing benefits for all interests without requiring mandates.

Currently stormwater mitigation is the single most costly mitigation for development projects. As the Phase II implementation occurs with dramatically great volume and quality mitigation requirements, low impact development is the most cost effective solution for nearly all projects, and the only solution for many projects to be financially viable. Let nature work with us to address stormwater quality issues rather than continuing to work against nature.

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- . NAHB Research Center (www.nahbrc.org)

There are many more references available in addition to those above. There is a wealth of research and monitoring results regarding low impact development throughout the U.S. as well as Europe and other countries.

Second, I would recommend requesting the creation of a Low Impact Development working group to gather and review known science regarding the water quality benefits of low impact development. Among those who should be included in the work group are; Dr. Chris May, Seattle Public Utilities and Curtis Hinman, WSU Extension - Pierce County. I would trust their judgment both for others who could contribute to the work group and what is appropriate known science. This work group could also develop recommendations for future research efforts regarding low impact development.

Low Impact Development Recommendations for the Puget Sound Partnership

Include Low Impact Development techniques as an important part of water quality improvement for the Puget Sound.

Flow Credits

Encourage review of existing monitoring projects to evaluate flow credits for low impact development techniques, especially for pervious pavement and bioretention. Currently DOE allows the void area in the volume of a bioretention cell to be used for volume mitigation, unless the bioretention cell has under piping. With under piping only the volume below the pipe is allowed for volume mitigation. The Seattle SEAStrreet project (has under piping) when modeled by the DOE method only shows a modest volume benefit, yet the projects own actual monitoring shows over 99% reduction in volume leaving the site compared to pre-retrofit, and it is reported that no stormwater has left the site since 2003 despite several unusually large storm events since. Bioretention is likely to be the widely used LID practice and one that shows spectacular results for water quality and infiltration back to aquifers.

DOE allows publicly owned pervious pavement to be modeled as landscaping, which still requires additional volume mitigation. If privately owned, it is treated as half landscaping and half impervious surface, which can be addressed by adequate maintenance requirements so that privately owned pervious surfaces can be treated as landscaping for volume mitigation. When under piping, all volume mitigation is eliminated. Thomas Cahill is an engineer with over 20 years experience in designing

and monitoring pervious pavements in the upper Midwest, New England, and Eastern Seaboard (in addition to Portland, Oregon). In articles, he reports that he designs the flow from five impervious acres into each acre of pervious pavement. We point this out to show the dramatic gap between flow credit modeling currently allowed by DOE and proved practices in other areas of the country.

"Fair" flow credits are needed. As flow credits become fairer, it is our opinion LID implementation will become the stormwater mitigation strategy of choice where LID use is appropriate.

Education

Encourage and support additional technical training on how to design, install, maintain as well as review and approve low impact development practices. Continuing education for the public, private sector, land owners, public and private sector engineers are all important so that all understand exactly what low impact development is and is not. The education should also teach to utilize these techniques in project design and construction - as well as how project that utilize LID techniques are reviewed and approved.

Rainwater Harvesting

Rainwater Harvesting is a potentially significant low impact development technique that is severely limited in usage due to Surface Water Rights issues. DOE currently allows rainwater harvesting without a surface water right permit for de minimus uses (i.e. for one single family home). Surface Water Right permitting is lengthy, expensive and difficult to obtain for larger projects. There should be a simpler, less expensive and more timely Surface Water Right permit when rainwater harvesting is used on larger projects. When an annual water budget that shows how all the collected stormwater will be used during that year, the roof area is no longer considered impervious. Uses for rainwater collection include; irrigation, grey water uses and when approved by the local health district even for potable uses. The environmental benefits include; collecting stormwater during it's peak events which reduce the volume effects traditionally found from impervious surfaces. The water is then returned to the surface or subsurface through irrigation, or internal building uses - generally through a septic system. While the stormwater is used, it is more delayed in it's return to the natural environment - generally returning large percentages of it back to the environment during drier periods of the year.

Maintenance

Maintenance is an important issue with low impact development techniques. Maintenance often raises questions of how to insure that LID installations will continue to perform in the future. While more research is warranted, LID maintenance requirements (especially for bioretention cells and pervious pavement) are simple and relatively inexpensive. In the initial LID implementation stages the

concern will be greater than once regulators have a period of time to actually monitor the effectiveness of different maintenance practices. While an important issue, education and practical applications will provide greater understanding and insight for regulators to understand appropriate maintenance practices.

Voluntary or Required

We believe that Low Impact Development should remain a voluntary stormwater mitigation strategy. Certainly incentivized to encourage its use where appropriate, but should not be required. Low Impact Development practices are not appropriate for all sites. LID practices are important, but only a partial solution to proper stormwater management. Other stormwater techniques such as regional or area management are other parts to the stormwater puzzle. In areas where soils are unsatisfactory for infiltration, there should be surface or piped conveyance to "regional" or "area" management. This could be on a fee basis to support these activities, and at these regional or area management facilities low impact development, detention, and other techniques could be used to clean the stormwater before infiltration or its use to supplement the hydrology of wetlands and streams.

We know that low impact development is very effective in removing stormwater pollutants. With fair flow credits it will also reduce development costs for stormwater mitigation, provide additional amenities to the development projects and reduce private and public maintenance costs.

Encouragement of its use by consistent standards for design and approval. Assistance in eliminating its use as an "exception" (exceptions take lots of time and money for approval.. "no good deed goes unpunished") in local codes. As these occur, low impact development will become the desired stormwater mitigation strategy for most future development - providing benefits for all interests without requiring mandates.

Currently stormwater mitigation is the single most costly mitigation for development projects. As the Phase II implementation occurs with dramatically great volume and quality mitigation requirements, low impact development is the most cost effective solution for nearly all projects, and the only solution for many projects to be financially viable. Let nature work with us to address stormwater quality issues rather than continuing to work against nature.

From: Darcy Nonemacher

Date: 05/02/2008

Comment: ***** DRAFT *****

Water Quantity Topic Forum White Paper

Comments By: Puget Sound Environmental Caucus Water Quantity Subcommittee

Note to Reader: This paper represents the preliminary work of the Puget Sound Environmental Caucus's Water Quantity Committee to respond to questions posed by the Puget Sound Partnership's "Initial Discussion Draft Freshwater Resources Topic Forum" document from April 14, 2008.

Under RCW 90.03.010, waters in Washington belong to the public and only the State has the authority to manage and regulate water resources for public benefit. The State, through the Department of Ecology, also has the authority to set instream flows to protect aquatic life and environmental values. RCW 90.03.247; RCW 90.22; RCW 90.54.020. Moreover, groundwater and surface water connections are common throughout the state, and in recognition of that fact, Ecology is statutorily required to consider the "natural interrelationships" between the two. RCW 90.54.020(9). Over time, Washington's water law and policy framework has become fragmented and unsuccessful in adequately protecting freshwater ecosystems.

To ensure long-term success, we strongly recommend that the Partnership include in its final issue papers detailed analyses on the financial and institutional barriers to implementing, monitoring, and enforcing the proposed management actions to protect freshwater resources. The Water Quantity Committee also urges the Puget Sound Partnership to recommend that the Legislature fully fund the Department of Ecology's programs to implement, monitor, and enforce existing environmental and water laws. Although incentive programs and voluntary measures play an important role in protecting water resources and should be sufficiently funded, the State's authority to manage water resources on behalf of the public must be reinforced in the Action Agenda to bring consistency, integration, fairness, and effectiveness to the system.

The Freshwater Resources Initial Discussion Draft identifies many important management actions that the State can do to balance water management for ecological needs and human demand. The PSEC Water Quantity Committee applauds the inclusion of the following actions:

1. Establishing instream flows in watersheds that currently do not have flow rules; revising outdated instream flows; connecting instream flows to the implementation of the Salmon Recovery Plan; and linking instream flows to the health of estuarine and nearshore habitat health

2. Pursuing strong instream flow and water policy compliance and enforcement measures, including establishing a water master in every watershed around the Sound and metering and reporting 80% of water use
3. Promoting demand management and implementing regulations and incentives for conservation, efficiency, and water reuse measures
4. Gathering useful and important data on the impacts of climate change on water resources
5. Recognizing the undeniable need to change the current legal and policy framework that perpetuates faulty water management practices
6. Integrating land use planning, watershed planning, ESA recovery planning, and other relevant aspects of water resource protection

Science Question 1 (S1): Status of Freshwater Quantity in the Puget Sound Region
(p. 3-17)

The Discussion Draft does a good job of connecting the health of freshwater resources to the health of Puget Sound. In particular, the Draft stresses the importance of:

1. The timing and amount of freshwater runoff into Puget Sound,
2. The role of freshwater inflows on marine and subtidal circulation patterns,
3. Saltwater intrusion in groundwater supplies, and
4. The role of impervious surfaces in decreasing the health of aquatic systems.

The document rightfully stresses the need to create a statewide program that compiles and reports water use information, quantifies the impact from permit-exempt well withdrawals, strengthens water right and illegal water use enforcement tools, and collects information on water system/supply management needs. However, it is important to emphasize the need for comprehensive analysis and monitoring in watersheds around the Sound. Without a significant investment in compliance monitoring, freshwater resource protection and prioritization of critical watersheds will be hindered. In addition, it is imperative that the State obtain resources to centralize existing information and gather additional data on the hydraulic continuity between groundwater aquifers and surface streams in localized areas.

Science Question 2 (S2): Effectiveness and Certainty of Management Approaches to Address Threats to Freshwater Resources (p. 18-24)

Flow:

The Puget Sound Environmental Caucus Water Quantity Committee agrees with the authors' assessment that "[e]xisting regulatory instream flows codified by state rule in Washington typically address only low flows. However, advancements in river science suggest that allocations of water to sustain native species and functioning

ecosystems, commonly called 'environmental flows,' need to address five components of flow: extreme low flows, monthly low flows, high-flow pulses, small floods, and large floods." See p. 18. The paper correctly identifies a need to shift instream flow methodologies to begin with a natural flow regime and define alteration from that starting point. Variations in flow rates provide important benefits to a watershed ecosystem and mimicking natural variations is important to supporting aquatic and terrestrial life.

The concept of "upside-down water rights" discussed on p. 19 of the draft highlights a need to use science and ecologically-based management approaches in freshwater systems. The document also argues that because of the prior appropriation doctrine, "other approaches would likely require legislative changes to Washington's water law." It would be helpful to explain this concept further by identifying ecosystem management approaches that may require legislative action as opposed management programs that may fall exclusively within government agency authority.

In addition to "upside-down water rights", another management approach is to introduce water budgets in watersheds for surface streams and groundwater aquifers. A water budget creates an accounting system that tracks the amount of inputs, outputs, and storage alterations in a watershed. When designed based on the natural hydrology and habitat functions, a water budget also supports the ecosystem-wide approach advocated by the Discussion Draft.

Demand/Supply Strategies:

Accurate demand calculations are an essential foundation to water resource management. In fact, demand management strategies that incorporate conservation, efficiency, and potentially water reuse should be pursued before new water supply projects are considered. However, any demand or supply management strategy must result in more water in surface streams and groundwater aquifers without contributing to the degradation of either water quantity or quality. While demand management is an important tool, further elaboration of the science of water reuse is important to understanding its usefulness as a management approach and to prioritize the best means for reducing demand and increasing stream flows.

In addition to Seattle, cities like Boston are making significant strides in accurately calculating and reducing water demand. The Massachusetts Water Resource Authority (MWRA) was created in 1985 to reduce per capita demand by 10 percent in three years. The MWRA identified inefficiencies in the City's infrastructure and formed a highly detailed audit system. As a result, the MWRA met its original demand reduction goal. The program was expanded to address efficiency problems in the City's water infrastructure; cultural and behavioral issues from domestic, commercial, and industrial water users; and pricing issues. Twenty years after the program began, the MWRA dramatically reduced water demand to 212 million

gallons per day as opposed to the original 2006 demand projection of 450 million gallons per day. See Water Efficiency Journal, Secrets of Their Success, (2008), available at http://www.waterefficiency.net/we_0801_secrets.html.

On the supply side, projects like those listed in the Discussion Draft vary in effectiveness, cost, and likelihood of environmental degradation. For example, the use of water marketing may be more effective than certain groundwater storage strategies, which may be more effective than a surface storage project. While the value of a supply project may depend on a case-by-case basis, the Discussion Draft appears to group supply options together indicating that each option is equal in terms of cost and potential ecological damage. Recognizing that time is extremely limited in the Puget Sound Action Agenda process, the Water Quantity Committee urges the freshwater water resource core team to avoid grouping water supply options without additional explanation on cost and environmental impacts. More consideration should be given to cheaper and less environmentally damaging alternatives, like conservation and efficiency.

Policy Question 1 (P1): What Are We Doing (or Not Doing) Now to Address Freshwater Resources in the Puget Sound Region? (p. 25-39)

Generally, the Discussion Draft accurately describes many of the threats facing freshwater flows in basins around the Sound. However, on p. 26 of the Draft, we recommend adding the following language (in italics), "Historical overallocation of fresh water, combined with the prior appropriation doctrine and permit-exempt water uses, affects our ability to maintain water in streams to protect fish and other instream resources."

The document also confronts the failure of many existing management strategies to promote surface and ground water protections that support ecosystem function. For example, on page 31 of the Discussion Draft:

Despite the large number of programs that involve some aspect of water quantity, the Puget Sound region does not have policies that address threats from an ecosystem perspective. In addition, land use planning is typically not well integrated with water supply planning. There is no one program that explicitly incorporates the linkages among ecosystem elements at any scale in the region to achieve ecosystem goals. There is no system-wide analysis or framework that integrates water management among the ecosystem elements.

As further evidence of the need for ecologically protective flows in freshwater basins, the Puget Sound Salmon Recovery Plan found that population growth and increasing demand on water in the region present, "an urgent and inescapable need to ensure sufficient instream flows to recover Puget Sound Chinook salmon".

Supplement to the Shared Strategy Salmon Recovery Plan, NOAA/NMFS, p. 10, (2006). The need for an ecosystem-based approach to water resource management must include predicted impacts from climate. According to the Climate Impacts Group at the University of Washington, changes in western Washington's weather patterns and water resources can be felt now. See [seattlepi.com Blog, Dateline Earth](http://blog.seattlepi.nwsourc.com/environment/archives/130857.asp), available at: <http://blog.seattlepi.nwsourc.com/environment/archives/130857.asp>; See also Univ. of Washington Climate Impacts Group, Climate Outlook, available at: <http://www.cses.washington.edu/cig/fpt/cloutlook.shtml>.

Other important policy considerations raised under Policy Question 1 include:

1. Management is more likely to succeed if coordinated at a regional scale in watersheds around the Sound;
2. Although necessary in every basin in the region, instream flow rules alone will not result in more water in surface streams;
3. Salmon recovery planning and implementation must incorporate science-based protection and restoration measures;
4. Watershed plans, Salmon Recovery Plans, and land use planning need to be integrated to be successful; and
5. Water marketing strategies have been successful and investments should be made to promote similar programs.

It is important to note that water markets are most successful in watersheds that have been adjudicated and may be an important tool to protecting small tributaries and addressing impacts from large water users.

Policy Question 2 (P2): What Needs to be Done to Address Threats to Freshwater Resources in the Puget Sound Region? (p. 40 +)

The Discussion Draft states that stormwater is addressed in the Land Use/Habitat Protection and the Water Quality papers. However, stormwater runoff has significant impacts on water quantity. Human activities such as construction of impervious surfaces, destruction of native vegetation, channelization of streambeds, rerouting of rivers and streams, destruction of wetlands, and construction of flood control facilities all play a role in stormwater management water quantity. These alterations frequently produce less stream flow in summer and fall, higher flash flows, impacts to salmon populations, degraded stream systems, and degraded estuarine habitat. As the Partnership begins to synthesize and integrate each topic forum paper, the Water Quantity Committee recommends including the water quantity impacts of stormwater and land use.

Strategies that are working:

- . Notably, many of the strategies highlighted in this section of the discussion paper are not currently implemented or have not been in place long enough to determine

success. For example, it is unclear how new instream flow rules that limit groundwater withdrawals from permit-exempt wells through a water "reservation" will provide additional water to meet instream flows. However, we also recognize the benefit to limiting exempt well use since the permit-exempt well loophole is a significant problem in the Puget Sound region.

. The Environmental Caucus Water Quantity Committee agrees that the strategies discussed in the discussion paper have promise. For example, the demand management strategy to reduce per capita water demand may reduce wasteful water use and avoid imposing additional burdens on water resources.

Strategies that aren't working:

. The Environmental Caucus agrees with the problems raised in this part of the draft on p. 41.

Six Strategies with Proposed Actions:

The following proposed management actions, if fully implemented and enforced, will help protect watersheds around the Sound.

. Instream Flows:

o The actions proposed in the Freshwater Resources Discussion Draft on instream flows are exceptionally important. While each action is critical, we are especially please to see a desire to incorporate instream flow assessments and flow targets into the Salmon Recovery Plan implementation process.

. Water Supply Needs and Demand Management:

o Water supply issues are increasingly urgent in the face of rapid population growth and predicted impacts from climate change. The Environmental Caucus agrees that regulations and incentives addressing water use are important. The Municipal Water Law of 2003 (ESSHB 1338) requires water suppliers to develop Water System Plans that incorporate conservation and efficiency measures. However, the law may not be enough to ensure that conservation and efficiency measures are adequately implemented in water demand projections and that more water is left in surface streams.

. Climate Change

o The Water Quantity Committee agrees that analysis and modeling of climate impacts uniformly in the ESU is desperately needed to assess regional and local impacts on water supply, demand, floods, groundwater, and ability to meet instream flow and fish targets. The Committee also agrees that developing strategies to address estimated climate impacts must be included in every issue facing the Sound.

. Instream Flows (compliance and enforcement)

o The Committee also agrees with the Discussion Draft's recommendation to develop compliance and enforcement plans, establish water masters for each basin to ensure compliance with water code, and require metering and reporting for 80% of water use (by volume) in all watersheds.

. Affirm the social, legal, and policy framework for water management

- o While the Water Quantity Committee generally agrees with the recommendations made by the Discussion Draft, we urge the authors to recommend actual regulation of permit-exempt well withdrawals. With over 3200 exempt wells drilled in the Puget Sound region every year, regulating and limiting permit-exempt well withdrawals to support ecologically protective stream flows is critical, especially in areas where ground and surface waters are hydraulically connected. If exempt wells continue unabated the effectiveness of other measures, like water markets and instream flow rules, will be hindered.
- o The Water Quantity Committee of the Puget Sound Environmental Caucus agrees with the Discussion Draft that the water rights adjudication process needs to be streamlined. While it may be implied in the Discussion Draft, it is important to quickly adjudicate water rights from both surface and ground water sources.
- o In terms of water supply management, the Water Quantity Committee is concerned about including storage, without additional details, as a supply management tool. Any storage supply project merits consideration on a case-by-case basis as to its benefit to stream flow as well as human supply. Water supply proposals that include storage should be used sparingly as a way to improve ecologically protective instream flows for aquatic life without impairing existing water rights. In some cases, cost-effective and environmentally protective measures like conservation and efficiency may avoid the need for expensive and detrimental storage projects.
- . Policy linkages
- o The Water Quantity Committee strongly agrees with the Discussion Draft's recommendation to integrate land use, watershed planning, water quality plans, ESA, and utility planning.
- o Limiting the impacts from stormwater is an important step to protecting freshwater resources that sustain the sound. In terms of reclaimed water, opportunities exist to efficiently reuse water so long as the use of reclaimed water actually results in more water in rivers and stream due to decreased demand. In addition, questions relating to the impairment of downstream water rights holders and environmental concerns with using reclaimed water for stream augmentation must be considered in any water reuse proposal.

Providing a timeframe for each of the proposed actions under "Policy Question 2" was generally helpful and did not exist in other topic forum discussion documents. However, additional clarification or explanation on how the timelines were decided upon would be helpful. For example, assessing instream flow rules that were set before 1985 is probably not a "long-term" strategy. The science clearly shows that a lack of sufficient flows to support ecological and human demand in watersheds around the Sound requires timely action by the State. Another example is the integration of planning and permitting for stormwater and reclaimed water infrastructure, which should be both a short-term and long-term action.

As the Discussion Draft points out, implementation, monitoring, and enforcement of

these strategies is vital to the Puget Sound Action Agenda's success. Therefore, the Partnership has a significant role to play to help obtain the funding and resource support necessary to accomplish these strategies. As the Action Agenda development process moves forward, it is important to maintain the high priority need for enforcement and compliance assessment resources.

Criteria for prioritizing actions:

As stated earlier, accurately assessing demand in a way that balances population growth, economic development, and ecological needs is a critical first step to answering water supply questions. Among other things, accurate demand calculations require assessments of existing infrastructure for inefficiencies, behavior modification tools like tiered pricing and public education, and a significant role for conservation and efficiency measures. Without these steps, a race to "claim" an inflated amount of water for the human population skews the balance toward waste and away from ecosystem needs. With this in mind, the criteria listed on p. 45 require further definition to reflect the ecologically sensitive approach advocated throughout the draft.

The discussion draft should also highlight the role of ecosystem services in prioritizing water supply needs. In reality, protecting the ecosystem not only benefits the flora and fauna in the region but human populations as well. For example, protecting the headwaters of watersheds provides many water supply and flood control benefits for residents downstream. Incorporating the positive values for ecosystem services in the development of the Puget Sound Action Agenda is an important first step to pursue innovative policy strategies that work.

Benchmarks/Progress:

The benchmarks proposed in the Discussion Draft provide a good starting point to assess what works and what doesn't work in protecting freshwater resources. One important benchmark omitted from the list includes tracking funding and resource allocation trends for implementing and enforcing freshwater management programs.

From: Skip Albertson

Date: 04/17/2008

Comment: When trying to prioritize between streams of similar flow, please consider measuring the landward stream over the seaward one. It makes more of a difference to the estuarine circulation (refer to the Knudsen relation).